Eur J Vasc Endovasc Surg **16**, 362–364 (1998)

CASE REPORT

Magnetic Resonance Imaging of Spinal Cord Infarction after Infrarenal Vascular Surgery

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Introduction

Spinal cord infarction occurs with an incidence of 0.1–0.9%[1,2] after infrarenal aortic surgery. Half of the cases occur after repair of a ruptured aneurysm, one-third with elective aneurysm repair, and the remainder after repair for occlusive atherosclerotic disease.

This note reports imaging of spinal infarction by magnetic resonance imaging (MRI) in one patient after right-sided iliaco-femoral bypass grafting and in two patients after implantation of aortofemoral bifurcation grafts.

Case Reports

Case 1

A 76-year-old male received an 8 mm ePTFE tube graft from the right common iliac artery to the common femoral artery for occlusive atherosclerotic disease Retroperitoneal dissection extended to 2 cm below the aortic bifurcation. Epidural anaesthesia was maintained through a catheter at the L_1–L_2 level. The operation took 70 min and was uneventful. Blood pressure was initially 180–200/90–100 mmHg and, at its lowest, 80/55 mmHg at the time of the skin incision. Postoperatively there was no function of the anal sphincter muscle and paraplegia. MRI the day after the operation was normal. Seven days after the operation, MRI showed an infarction of 5 cm length in the central part of the conus medulla (Fig. 1).

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Case 2

A 62-year-old female with atherosclerosis had a Dacron bifurcation graft from the aorta to the profunda femoris arteries. The epidural catheter was inserted at the Th_{10}–Th_{11} level. Blood pressure was 200/100 mmHg at the induction of anaesthesia but fell to 90–100/50–60 mmHg during most of the uncomplicated operation, which took 2 h. Postoperatively the patient had anal sphincter paresis and paraplegia. MRI 6 days after the operation showed infarction of the caudal part of the medulla, including the conus (Fig 2).

Case 3

A 54-year-old male with aortoiliac and common femoral artery aneurysms had an ePTFE bifurcation graft from the aorta to the superficial femoral/profunda femoris arteries bifurcations. The epidural catheter was inserted at Th_{11}–Th_{12}. The operation was uneventful and took 2.25 h. Blood pressure varied 100–135/70–85 mmHg. Postoperatively the patient had partial anal sphincter paresis and paraplegia. MRI the day after operation was normal, but repeat imaging on the fourth postoperative day showed a 1 cm infarction at Th_{12} in the middle of the conus.

Technique

In all three cases standard anaesthetic and operative techniques were used, and major arterial branches were not clamped or ligated MRI was performed with

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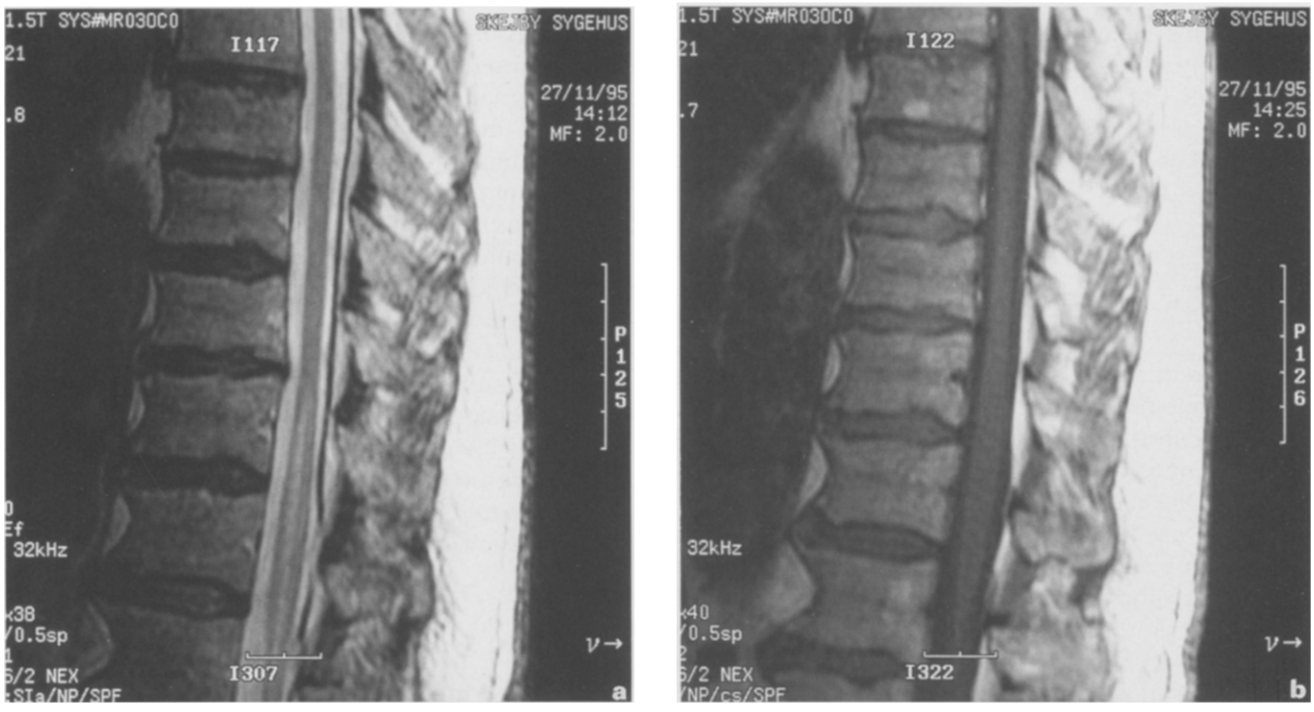

Fig. 1. Case 1 Medullary infarction Area of high signal intensity on a T2-weighted sequence (a) and low signal intensity on T1-weighted sequence (b), together with a slight increase in spinal cord volume

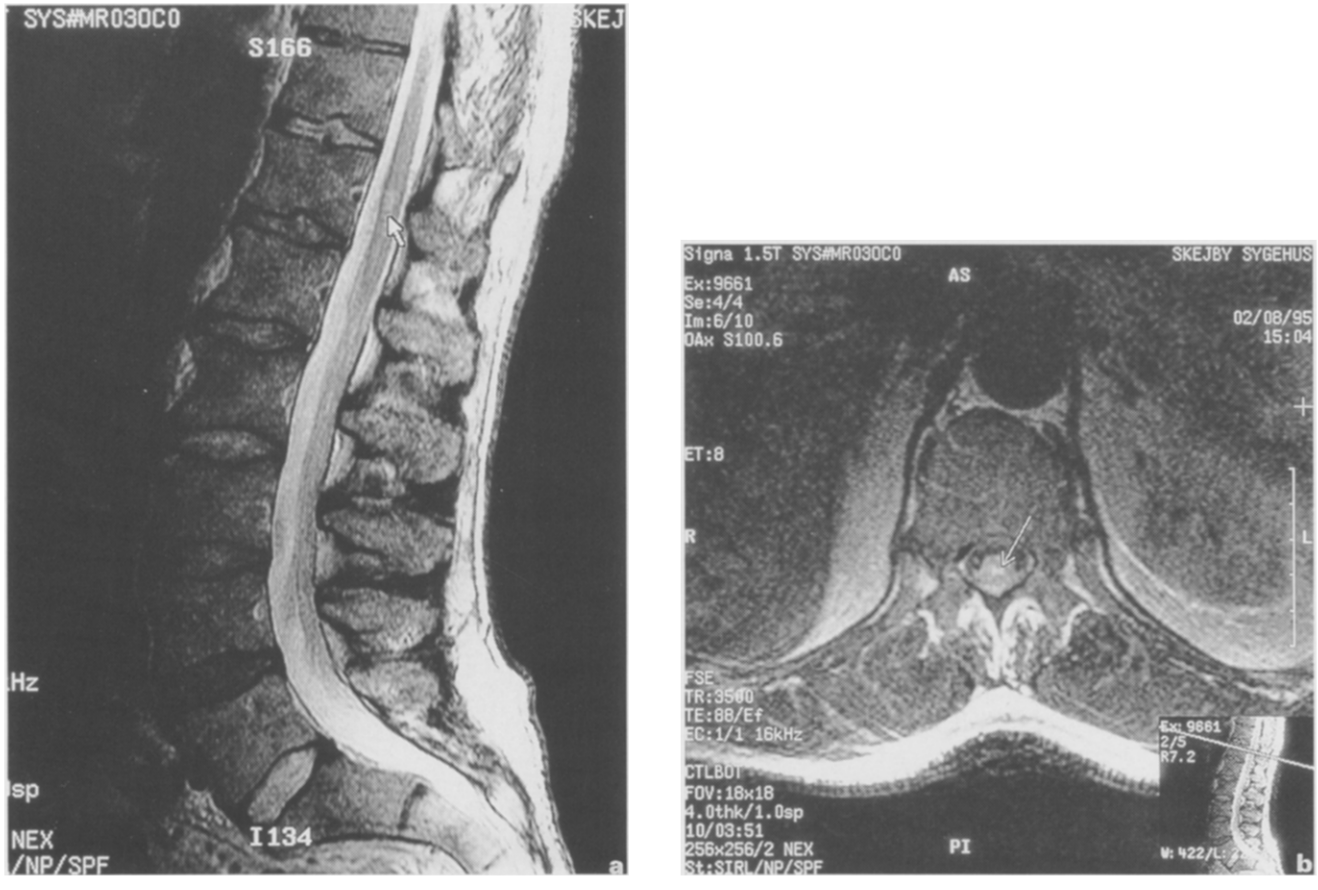

Fig. 2. Case 2. Focal area of signal hyperintensity on T2-weighted images (a) sagittal projection, (b) axial projection

a 1.5 Tesla system (Philips Gyroscan, General Electric Signa) with sagittal and axial T1 (TR/TE 500 ms/22 ms) and T2 (TR/TE 2000 ms/90 ms spin echo or T2 fast spin echo (TR/TEef 3500 ms/90 ms) sequences. Slice thickness was 4 mm, with an interslice gap of 1 mm.

Discussion

MRI signs of spinal cord ischaemia after resection of thoracoabdominal aortic aneurysms have previously been described.[3] A review of the literature listed 61 MRI-examined cases but none after infrarenal vascular sugery.[4] One report has since been published where MRI was used to show spinal cord infarction after elective implantation of an aorto-profunda femoris arteries prosthesis for abdominal aortic aneurysm.[5] Our first case occured in October 1991, the last in November 1995 During this time we performed 656 elective aortoiliac/femoral open procedures (372 for atherosclerosis, 284 for infrarenal aortic aneurysm; frequency of spinal infarction: 0.3%) and 72 elective unilateral iliaco-femoral bypass graftings.

Review of histories, objective findings and preoperative DSAs gave no clue as to why these patients were at risk. They were haemodynamically unstable and all had epidurals but these cannot be identified as specific pathogenetic factors in this small series. Spinal cord infarction after prosthetic bypass procedures must be extremely rare, and the aetiology remains obscure.

MRI was made with standard techniques. Findings of focal conus medullaris diameter increase, focal medullary signal hypointensity on T1-weighted images and focal medullary signal hyperintensity on T2-weighted images were interpreted as infarction. One must distinguish between haemorrhage (spinal cord compression), which is potentially treatable, and spinal cord infarction, which is not. Haemorrhage would have presented itself as an intra- or extramedullary lesion with low signal intensity on all sequences (acute haematoma) or with high intensity on T1-weighted sequences (subacute haematoma)

In conclusion, patients with postoperative neurological deficit should be examined at once by MRI. In the absence of compression or haemorrhage repeat imaging should be performed 1 week later to document the localisation and extent of infarction.

References

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Accepted for publication 27 January 1997